

Initiative: Voluntary Risk-Informed Alternative Pressurized Thermal Shock Limits

Lead Office/Division: NRR/DPR

Supporting Offices/Divisions: NRR/DCI, NRR/DRA, RES/DFERR

Description

The proposed rule would amend the Commission's regulations (§ 50.61) that protect against brittle fracture of reactor vessels during severe cooldown events. The existing regulations establish screening limits that were developed based on what NRC believed to be a conservative probabilistic fracture mechanics analysis. Several licensees will exceed the screening limits in the current rule during their license renewal periods. The staff proposes to provide alternate fracture toughness requirements which reflect the updated technical basis in the proposed rule.

The NRC has been engaged in a research program to re-evaluate and update the technical basis of the risk of through wall cracking due to pressurized thermal shock (PTS) and recommends that the regulations be amended to reflect the updated technical basis. Revising the PTS requirements would permit some reactor vessels that are approaching the current maximum permissible level of embrittlement to postpone permanent shutdown. Current regulations allow a licensee to avoid shutdown if they perform a safety analysis to show that operation with a PTS higher than the screening criteria is safe, or if they anneal the reactor vessel.

The staff issued SECY 07-0104 "Proposed Rulemaking — Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events (RIN 3150-AI01)" on June 25, 2007. This SECY requested Commission approval to publish for public comment a proposed rule that would provide new fracture toughness requirements for pressurized water reactors (PWRs). This SECY may be found at:

<http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2007/secy2007-0104/2007-0104scy.pdf>